

Pulse Crop Nematode Survey



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Damage to an alfalfa field caused by the stem and bulb nematode, *Ditylenchus dipsaci*.

Nematodes can cause dramatic reductions in pulse crop yields. The nematodes surveyed for are primarily of regulatory significance and could negatively impact our agricultural export markets if detected within Montana.

Damage caused by the pea cyst nematode, *Heterodera goettingiana* results in patches of stunted, bright yellow plants. Yellowing begins at the base of the plant with the older leaves and continues to move up the plant affecting the entire plant. Some of the affected plants may also die prematurely due to lack of chlorophyll. The roots of affected plants develop abnormally and nitrogen deficiency typically occurs due to a lack of nitrogen fixing nodules on the roots. As a result, seed production is also significantly reduced. The nematodes can persist for an extended period of time within the soil without a known host, yet cause significant damage when crops are planted again.

In an unfunded survey in support of the pulse crop industry, Montana Department of Agriculture employees collected 45 soil samples throughout Daniels, Roosevelt, Sheridan and Valley Counties. Crops represented in the samples included chickpeas, lentils, green peas, yellow peas and fallow fields.

Soil was analyzed for over thirty five nematode species, sixteen species of regulatory concern and nineteen other plant-parasitic genera, including: *Globodera rostochiensis*, *Globodera pallida*, *Ditylenchus destructor*, *Ditylenchus dipsaci*, *Meloidogyne chitwoodii*, *Meloidogyne fallax*, *Meloidogyne hapla*, *Meloidogyne javanica*, *Meloidogyne artiellia*, *Nacobbus abberans*, *Heterodera glycines*, *Heterodera latipons*, *Heterodera goettingiana* and *Pratylenchus* sp.

This information is important for Montana farmers in their management techniques and it also allows specific areas to be certified as free from some of these nematodes. This enables Montana producers to gain access to a wider agricultural export market for their crops. Montana growers plant over 500,000 acres of pulse crops (dry peas, dry beans, lentils, and garbanzo beans) annually, harvested crops are valued at over 50\$ million. Montana pulse crops are exported to many Asian and Middle Eastern countries including China, India, Pakistan, Egypt, Nepal, and Turkey.

RESULTS:

2008 PULSE CROP NEMATODE SURVEY RESULTS		
Species of Regulatory or Economic Concern	Group	POSITIVE/NEGATIVE
<i>Bursaphelenchus xylophilus</i> (Steiner and Buhrer)	Pine wilt	NEGATIVE
<i>Ditylenchus destructor</i> Thorne	Potato rot	NEGATIVE
<i>Ditylenchus dipsaci</i> (Kühn)	Bulb and stem	NEGATIVE
<i>Globodera pallida</i> (Stone)	Potato cyst	NEGATIVE
<i>Globodera rostochiensis</i> (Wollenweber)	Potato cyst	NEGATIVE
<i>Heterodera glycines</i> Ichinohe	Soybean cyst	NEGATIVE
<i>Heterodera latipons</i> Franklin	Cereal cyst	NEGATIVE
<i>Meloidogyne arenaria</i> (Neal)	Root knot	NEGATIVE
<i>Meloidogyne artiellia</i> Franklin	Root knot	NEGATIVE
<i>Meloidogyne chitwoodi</i> Golden et al.	Root knot	NEGATIVE
<i>Meloidogyne fallax</i> Karssen	Root knot	NEGATIVE
<i>Meloidogyne hapla</i> Chitwood	Root knot	POSITIVE
<i>Meloidogyne incognita</i> (Kofoed & White)	Root knot	NEGATIVE
<i>Meloidogyne javanica</i> (Treub)	Root knot	NEGATIVE
<i>Meloidogyne mayaguensis</i> Rammah and Hirschmann	Root knot	NEGATIVE
<i>Nacobbus aberrans</i> (Thorne)	False root knot	NEGATIVE
Other Plant-Parasitic Genera	Group	POSITIVE/NEGATIVE
<i>Anguina</i>	Seed gall	NEGATIVE
<i>Aphelenchoides</i>	Bud and leaf	NEGATIVE
<i>Belonolaimus</i>	Sting	NEGATIVE
<i>Cactodera</i>	Cactus cyst	NEGATIVE
<i>Ditylenchus</i> other species	Other	POSITIVE
<i>Helicotylenchus</i>	Spiral	POSITIVE
<i>Heterodera</i> other species	Cyst	POSITIVE
<i>Hemicycliophora</i>	Sheath	NEGATIVE
<i>Hoplolaimus</i>	Lance	NEGATIVE
<i>Longidorus</i>	Needle	NEGATIVE
<i>Mesocriconema</i>	Ring	POSITIVE
<i>Paratrichodorus</i>	Stubby root	NEGATIVE
<i>Paratylenchus</i>	Pin	POSITIVE
<i>Pratylenchus</i>	Root lesion	POSITIVE
<i>Quinisulcius</i>	Stunt	POSITIVE
<i>Rotylenchulus</i>	Reniform	NEGATIVE
<i>Trichodorus</i>	Stubby root	NEGATIVE
<i>Tylenchorhynchus</i>	Stunt	POSITIVE
<i>Xiphinema</i>	Dagger	POSITIVE
<i>Merlinius</i>	Stunt	POSITIVE

All samples were processed in the lab of Dr. Thomas O. Powers at the Department of Plant Pathology , University of Nebraska.

Meloidogyne hapla Chitwood, the northern root knot nematode was detected in a single sample. The northern root knot nematode affects many species of vegetables and weeds and can cause significant economic damage. *Heterodera trifolii* (Goffart), the clover cyst nematode was detected in several samples at levels that are probably causing economic damage for pulse crop producers. Other plant parasitic genera that were detected were not found if high enough numbers to indicate that they are causing yield losses. Typically, genera such as *Paratylenchus* and *Quinisulcius*, only are injurious to crops when numbers approach 500-1,000 individuals per 100 cc of soil.



Pea field in Northeastern Montana.

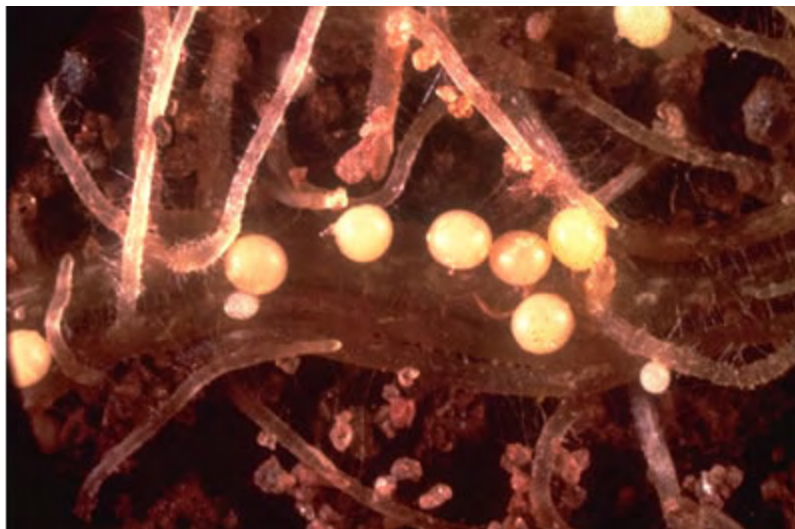
Potato Cyst Nematodes
***Globodera pallida* (Stone) & *G. rostochiensis* (Wollenweber)**
Detection Survey

INTRODUCTION

Montana is a supplier of seed potatoes for much of the Pacific Northwest. Because of this, it is imperative that the quality of Montana's potatoes, and their reputation, be maintained. Recently, *Globodera pallida* was found in Idaho, in commercial potato fields. In the aftermath of this find, several trading partners closed their doors not only to Idaho potatoes but also to other crops including nursery stock, and sampling to determine the extent of the infestation is still ongoing. If this organism were discovered on seed potatoes from Montana, there is a real possibility that it would destroy the seed potato industry. The Montana potato industry plants over 10,000 acres annually with crops valued at over 30\$ million.

Shortly after this find, producers in Alberta (Canada) found golden cyst nematode (*Globodera rostochiensis*) in fields. This initiated international action again, with subsequent trace-forward action involving a Montana field.

The presence of either of these organisms in Montana would have devastating impacts on the seed potato industry. Action can be taken now to 1) systematically determine if these pests have invaded Montana and, 2) shield the potato industry by creating an internal quarantine system, so that if potato cyst nematodes were found in any area of the state, the remaining production areas could continue to ship.



Globodera pallida cysts, www.eppo.org/



Globodera rostochiensis cysts, www.eppo.org/

PLAN OF ACTION

A statewide survey of seed potato producers was developed to adequately represent and sample potato production areas. Survey's in 2008 were conducted in several counties with potato crops identified as economically important to Montana's export markets. The counties sampled in 2008 were Beaverhead, Gallatin, Madison, and Sheridan.

Samples were collected using USDA protocols. Each sample consisted of five pounds of soil per acre of crop in field that were just harvested from potatoes. Data collected included date of collection, collector, potato variety, seed generation, and field number.

RESULTS

Twenty-six grower operations were sampled for a total of 1,480 samples. Sample processing is ongoing. This survey is planned to continue in the spring, prior planting.